

RACIAL POISONS

II. ALCOHOL

By C. W. SALEEBY, M.D., F.R.S.E., F.Z.S.

A. Preliminary Considerations

IT may be as well to begin by removing a misconception regarding the use of the term racial poison. Unfortunately it has been employed in various quarters lately as if it were applicable to any substance that poisons a large number of individuals at any time. When thus used, however, the *differentia* of the term is entirely missed. Indeed, the term was introduced by the present writer some three years ago precisely in order to distinguish between the action of substances upon an individual as an individual and their action through the individual upon the race: "by a racial poison I understand a substance which, whether or not injuring the individual who takes it, is liable to injure the race of which he [or she] is the trustee." It is all-important for the eugenicist to make this distinction. Thus strychnine is a poison, but deadly though it be to the individual, it is so far as we know not a racial poison—except in so far as that anything which kills the individual interferes with the race. Again, the community as a whole takes very many poisons—as, for instance, boric acid—in its food every day, and this is a question by no means negligible; but it is a problem in hygiene, not in eugenics, so long as we are without any evidence that these adulterants prejudice the individual's parenthood. Morphine, on the other hand, is believed by the most authoritative observers, such as the late Professor Brouardel,¹ to have a racial influence, and a still more recent student of high authority, Dr. Harrington Sainsbury, writes as follows:

¹ *Opium, Morphine, et Cocaine*, P. Brouardel (Baillière et fils, 1906), p. 68.

"It has been established that the unborn child may acquire the habit from a mother; this is not surprising, seeing that the saturation of the parental system with morphia must involve a saturation of the system of the offspring. Such children, after birth, may show a restlessness and sleeplessness which resist ordinary treatment but at once yield to a dose of morphia."¹

It may not, at first, seem at all obvious why one alkaloid, such as morphine, should be included in our category, and another, such as strychnine, should not; and it would lead me too far afield at present to attempt to show in detail why these distinctions exist. It may, however, be pointed out, by way of an indication to the line of reasoning, that in the case of morphine we have a substance which, besides its local influence upon the brain, has a general action upon the bodily chemistry as a whole, as is remarkably shewn by its influence upon the disordered chemistry of the disease known as *diabetes mellitus*. Strychnine, on the other hand, has a conspicuously localised action, the most careful pharmacological experiments having failed to reveal almost any appreciable action of this drug except upon one special type of nerve cell, which is found in the anterior cornua of grey matter in the spinal cord and in the homologous morphological elements of the medulla oblongata, the pons, and possibly even higher encephalic centres. This distinction between two substances apparently so similar is worth insisting upon.

In alcohol we have a remarkable parallel to morphine and a contrast to strychnine. All three compounds affect nervous tissue, and it is this effect upon nervous tissue that is generally known. What is not generally known is that alcohol, like morphine and unlike strychnine, has an effect upon the tissue-chemistry everywhere, as can be readily shown by its numerous actions upon general metabolism, upon the chemical reduction of the oxy-hæmoglobin of arterial blood, and in many other ways. It is therefore not incomprehensible that morphine and alcohol have racial effects and are to be classed as racial poisons, whilst strychnine, so far as we know, is outside this category.

Hitherto, I have made no attempt to form a comprehensive catalogue of racial poisons. My object from the first has been

¹ *Drugs and the Drug Habit*, by Harrington Sainsbury, M.D., F.R.C.P. (The New Library of Medicine, Methuen & Co., 1909.)

to direct the attention of professing eugenists to the fact, wholly ignored by them hitherto, that such poisons do exist. I have never referred to more than four—alcohol, lead, morphine and the poison of syphilis. Of course, there are many more, such as mercury, phosphorus and the “protoplasmic poisons” generally, and quite apart from the true “blastophthoria” of Forel, recent research has gone far to enable us to distinguish between poisons which, circulating in the blood of the expectant mother, are arrested by the placental filter, and fail to enter the circulation of the child, and those on the other hand which pass readily through the filter, thus poisoning both organisms. All of these details are important, but the main point for eugenists at this early stage of our campaign is to recognise that there are such things as racial poisons, and to concentrate upon combating the more important of them, which are undoubtedly alcohol, syphilis and lead.

It may be noted that, alike in practice and in theory, the term racial poisons may be equally applied to a substance, such as alcohol or lead, which is introduced as such into the body, or to any substance, no less chemical though of different origin, which is produced in the body in consequence of the vital interplay between the bodily tissues and the cells of some invading micro-organism, such as the *spirochaete* of syphilis. No doubt there is here a practical distinction for the eugenist, since marriage without parenthood may be permitted to a person suffering from, shall we say, lead-poisoning, whereas marriage even without parenthood is a crime on the part of a person suffering from a contagion such as syphilis. But though this pragmatic distinction exists, both lead and the toxins of syphilis may legitimately be called racial poisons. Syphilis was dealt with in the last number of this REVIEW; lead will be dealt with in the next. The special concern of the present paper is with alcohol.

B. Alcoholism as a Symptom of Degeneracy

Very few people realise how complex are the relations of alcohol to parenthood, and any failure of analysis, depending in its turn upon ignorance of the biological facts involved, will lead

to error. In the first place, I will refer as briefly as possible to an extremely important relation between alcohol and parenthood, in which the action of alcohol as a racial poison is in a sense quite subsidiary. There exist large numbers of persons in the community whose nervous organisation is naturally defective, and who take alcohol to excess—that is to say, to what is excess for them, though the actual amount may be incredibly small—and whose intemperance is not a sin but a symptom. In such cases, to be scientific is to be charitable. The person in question is a patient, and alcoholism is one of his symptoms as pain is one of the symptoms of a fracture. Here the business of the eugenicist is to recognise the alcoholism as a symptom, index, label, what you will, which declares the individual to be dysgenic—a term that may conveniently be used to mean unworthy for parenthood. It is true that alcohol as a racial poison, acting upon the parents of such an individual, who may themselves have been natively healthy, is very probably the cause of his native condition, in the fashion which I shall later discuss. But he is what he is whether he be or become a total abstainer or not, and the real importance of the alcoholism in his case, if he happens to present that symptom, is as a warning for the eugenicist. It is true, also, that if such a person be alcoholic, the blastophthoria, or poisoning of the germ, which in the previous generation produced him, may be resumed, still further to injure the next generation. But in any case such a person is condemned by the principles of negative eugenics and our duty is plain.

I now go on to show, also as briefly as possible, how the case lies in contemporary politics.

The Eugenics Education Society has, from the first, recognised and fought for the principle that alcoholism is often a symptom of native nervous defect such as should most certainly disqualify for parenthood. But time passes, and many readers may have forgotten what we have already accomplished. A recent administrative scandal in this connection in London brought eugenicists into the field and a Committee of the Home Office was appointed, which reported in January, 1909, and the report of which will doubtless form the basis of legislation. Such legislation was indeed promised in a recent King's speech,

but nothing further has been accomplished hitherto, for the cause of the future, by what Adam Smith described as "that insidious and crafty animal vulgarly called a statesman or politician." I have elsewhere dealt with this question in detail, and it is not necessary to return to it here. Eugenists and especially members of the Eugenics Education Society may be gratified to know, however, that since January 1st of the present year 1910, it has been again possible for magistrates in London to commit chronic inebriate women to reformatories, the sordid squabble between the Treasury and the London County Council having been adjusted in deference to the public opinion which our Society did much to create.¹

C. Alcoholism as a Cause of Degeneracy

Let us pass now to the action of alcohol as a racial poison. It is a notable circumstance, yet easy of explanation, that overt eugenic research hitherto has totally ignored the question of the origin of defects such as bring the individual under the ban of negative eugenics. Anyone whose daily business it is by voice and pen to preach eugenics will soon discover that the thoughtful members of the public to which he appeals are interested in this question, as indeed they ought to be. So, indeed, ought we to be, but hitherto official eugenic research has concerned itself entirely with transmission and not at all with origin. However, when the eugenicist has pointed out how urgent is the need of interference with the transmission of degeneracy, he is certain to be asked as to the origin or prime cause or causes of degeneracy. Members of one political party, for instance, will ask him whether under present environmental conditions, such as, for instance, overcrowding and bad nutrition, healthy stocks are not daily being converted into unhealthy ones. We really cannot afford any longer to be so absorbed in the question of transmission as to ignore the question of origin. It is our great claim that we begin at the beginning, and reckon with the nature of the individual, which the rest of the world takes for nought, regarding only his environment or nurture. But if it comes to that, we

¹ The reader may be specially referred to Dr. Welsh Branthwaite's lecture "Inebriety: Its Causation and Control," *British Journal of Inebriety*, Jan., 1908.

must begin at the beginning ourselves. We might find, for instance, that environment in preceding generations had been the beginning of the degeneracy we were later confronted with.

Or we may not so find; but in any case we must seek for what there is to find. Eugenists are too apt to accept without analysis the modern biological rejection of Lamarckianism, believing that "acquired characters are not transmitted," and assuming an exact correspondence between words and realities which may obtain in Paradise but is only a Will-o'-the-wisp here. We utterly confound things which are utterly different, and we do it quite contentedly, notwithstanding that our error had been corrected in anticipation, before many of us were born, by the august Honorary President of our Society, who is the founder of the modern doctrine that parental modifications due to use and disuse, and the like, are not transmitted, as well as by Weismann, who is commonly but erroneously credited with the priority in this theory which, as can be shown, is in point of fact Sir Francis Galton's.

The aid of the practical biologist, and not least of those who are at work upon the various branches of medical science, is much needed in this connection. Unfortunately, too few students of eugenics are medical men, the medical profession not yet having realised that the stage of attention to individual hygiene, in which it is now finding itself, must necessarily go even further, when racial hygiene—that is to say, negative eugenics—will be the goal and ideal of that great profession. It is at present a very serious matter that eugenists are not acquainted with physiology or pathology, pharmacology or toxicology; not to mention the great science of obstetrics, which will be the hand-maid of practical eugenics in the near future. It is quite certain that we cannot for ever be content with the familiar enquiries which show to what extent feeble-mindedness, for instance, is transmissible. There is also the pathological inquiry, needing an inquirer who is a pathologist, as to its primary causation.

The Meaning of Reversion.—By way of preamble it may be briefly noted that persons not too familiar with the work either of Darwin or of his successors are very apt to darken counsel in this regard by using words without knowledge. The most con-

spicuous instance of what I mean is the misuse of the word "reversion." People who know neither the Darwinian employment of the word nor the Mendelian elucidation of the thing tell us that feeble-mindedness is a case of reversion. Mating certain fancy pigeons, Darwin obtained the blue rock ancestor, and that he called reversion. But, in the first place, our ancestors, primitive man, the remoter Lemuroids, were not feeble-minded. A much graver objection is that the Mendelians have now discovered what reversion is, and have given the word a definite meaning.¹ In this particular case, for instance, we now know that the so-called reversion is due to the coming together again of those two Mendelian units, the combination of which in the zygote conditioned the blue colour and other characters in the ancestral form. When the modern biologist hears talk of an idiot, for instance, as a case of "reversion," he may almost be excused for the contempt which I fear he too commonly feels for these excursions, guided only by uncomprehended words, into the realm of biology. If we are to apply a word of this kind to the case of feeble-mindedness, we can make a compromise by retaining the last two syllables of the term which has so long been conjured with and changing the first. I suggest *perversion* as the best term to describe the process which results in the defective-minded. This term suggests a vitiation of development, and the evidence has now for several years been overwhelming that this perversion is often due to that damaging or poisoning of the germinal material, which the great contemporary master of this subject, Forel of Zurich, has termed "blastophthoria," and which I shall discuss in detail shortly.

The Lamarck-Galton-Weismann controversy.—The modern teaching regarding heredity is that functionally produced modifications are not transmissible, since they are not capable of producing *representative* reconstructions in the germ-plasm. If, following Lucretius, we liken the germ-plasm to the lamp carried by runners in certain ancient races,² then we may say that changes produced in the runner's body do not representa-

¹ See *The Methods and Scope of Genetics*, by W. Bateson, M.A., F.R.S., Cambridge University Press, 1908, p. 48, and *Mendel's Principles of Heredity*, by W. Bateson, Cambridge University Press, 1909, p. 99 *et seq.*

² "Et, quasi cursores, vitai lampada tradunt."

tively affect the lamp. An instance of a functionally produced modification is the biceps of the blacksmith; in another sphere we may take the knowledge of a language. By a most unfortunate substitution, this clumsy but accurate and unambiguous phrase, functionally produced modifications, has lately been replaced by the term "acquired characters." Herbert Spencer, who in any case thought in realities, and not in other people's phrases, always used the older term. The newer one is based, I suppose, upon Lamarck's original "*changements acquis*," by which he meant such things as the blacksmith's biceps. Neither Lamarck, however, on his view, nor Galton, when he denied that such a thing as the blacksmith's biceps is transmissible, nor yet Weismann in his subsequent labours, ever committed the quite puerile absurdity of confusing such a thing as the hypertrophy of the blacksmith's biceps with, say, the consequences of soaking the entire organism for years in the poisons of syphilis, or alcohol, or salts of lead. Unfortunately, people talk about what happens to acquired characters, and what is and is not possible, without ever having read their Galton or their Weismann, and the phrase catches them out. The general bodily consequences of alcoholism are, of course, acquired characters *in the ordinary meaning of English words*. And so we used to have one party declaring, on what they supposed to be the Galton-Weismann theory, that alcoholism cannot possibly affect offspring; and another party declaring that, since plainly the effects of alcoholism must and do affect the offspring, the doctrine that acquired characters are not transmissible is evidently nonsensical. Both parties are fooled by the words. If we had retained the older phrase—"functionally produced modifications"—people would see that, as Weismann has specifically stated in *The Germ-Plasm*¹, the effects of poisonings have nothing to do with the controversy. One may quote a sentence from Galton, and we shall observe how perfectly simple and self-evident the whole thing is when dealt with by a man who is thinking in terms of things, and not in terms of phrases that someone else has invented. Says Sir Francis in the prefatory chapter (p. 15) to the second edition of *Hereditary Genius*: "As a general rule, with scarcely

¹ English translation in "Contemporary Science Series," p. 386.

any exception that cannot be ascribed to other influences, such as bad nutrition or transmitted microbes, the injuries or habits of the parents are found to have no effect on the natural form or faculties of the child." We see that it never even occurs to him that bad nutrition (*e.g.*, through alcohol or lead) or transmitted microbes (*e.g.*, of syphilis) can possibly be regarded as having anything to do with the question which he is discussing—that is, the question of the transmission of functionally produced modifications.

The Royal Commissioners on the Care and Control of the Feeble-minded have declared that feeble-mindedness is not due to influences acting on the parent, and by introducing the word "spontaneous" they have succeeded in excluding any causation at all for feeble-mindedness—a very interesting conclusion, but one against which the whole universe protests. The word "spontaneous" the Commissioners have borrowed from Darwin. Its fate is the same as in every other case where a great man introduces a term. Darwin specifically and scrupulously employs the word as a convenient expression which meant for him "due to causes I do not know." The inevitable has happened, and now the word means "due to no causes." The Commissioners consider that feeble-mindedness is not due to influences acting on the parent, and they base this conclusion on "grounds of fact and theory." I wonder whether they would allow us to say that it is due to influences acting *in* the parent, or whether they could find grounds of fact and theory contravening that supposition. What, then, if we put alcohol or lead *into* the parent? Directly we leave words and begin to think of things, we discover that the individual body contains tissue from which new individuals are formed. We discover also that this tissue, being alive, depends for oxygen and food upon the body of its host, and upon that body, also, for the removal of its carbonic acid and other *excreta*. We can actually see the blood-vessels running to this tissue and the veins coming back from it: we can readily, when the substance has been taken by the individual, detect alcohol in it¹; and in the light of these concrete realities, phrases about "grounds of theory" tell us more about Royal Commissions than about mere feeble-mindedness.

¹ In about eight minutes after ingestion.

Evidently, the onus of proof now rests with those who shall deny that alcohol, for instance, has any influence upon the germinal tissues through which it demonstrably circulates. The controversy between Lamarck and Galton has no more to do with the subject than the controversy between Galileo and the Inquisition; it is a mere red-herring drawn across our path. The question is whether the germ-plasm, unlike all other known tissues, is incapable of being injured by alcohol.

D. Blastophthoria

For various historical reasons, and also no doubt as a consequence of our sterner attitude towards vivisection, we in this country have long lagged behind in almost every branch of experimental pharmacology and toxicology. It is necessary to go to continental and American workers for positive facts of experiment and observation obtained under scientific conditions, in these important fields of medical and, as we shall see, of genetic science. It has already been shown, by quotations from Galton and Weismann, that the possibility of poisoning the germ-plasm in either sex cannot be questioned. When we enquire into the conditions under which the racial or parental tissues, as we may call them, are nourished, we find, as has been shown, that they are at the mercy of the blood and its contents. If these contents include certain substances, belonging to the category of racial poisons, there not only may ensue, but has been exhaustively proved to ensue, a poisoning of the germ for which the generally recognised name amongst those who study this subject is blastophthoria. Forel, to whom we owe this name, very well remarks that it might be called "*La Fausse Hérité*." By heredity in the strict sense we ought to mean nothing but the normal organic relation between living generations. The action of a racial poison upon the germinal tissues is therefore wisely to be distinguished as "*false heredity*." As Forel puts it—and perhaps it may be more convenient to quote from the English translation, which is in this case quite literally rendered from the French:

"Blastophthoria thus acts on germs not yet conjugated through the medium of their bearers, and creates at their origin hereditary stigmata of

all kinds, while true heredity only combines and reproduces the ancestral energies. . . . It is not a question here of the reproduction of the hereditary ancestral energies in the descendants (in different combinations) as is the case in the heredity which we have just studied, but, on the contrary, a question of their perturbation. However, the store of cells reserved as germinal cells in the embryo the germ of which has been damaged by blastophthoric action, being usually also affected by the disturbing cause, it follows that the pathological change introduced by blastophthoria in the hereditary mneme is transmitted to the descendants by ordinary heredity. In this way blastophthoria deposits the first germ of most pathological degenerations.”¹

The reader may also be referred to a lecture delivered by Forel so long ago as 1890, before the students of the Universities of Christiania and Upsala, and published under the title “*La boisson dans nos mœurs.*” After referring to the work of Legrain, Grenier, Garnier, Laurent and Demme, Forel summed up the evidence as it was twenty years ago in the following words :

“ Les faits ci-dessus sont la démonstration du fait que l'alcool que nous absorbons empoisonne directement les germes de l'homme et de la femme avant la conception et les tare ainsi d'une façon variée dont l'effet se retrouve sous la forme de diverses maladies et difformités des malheureux qui en sont le produit.”

But it need hardly be said that a matter of such immeasurable importance does not remain now merely where it was twenty years ago. Since this announcement of Forel, a vast amount of work has been done, and several specially devised experimental studies upon the lower animals have been included. In some of these, as for instance in the work of Combemale, the distinction between true blastophthoria and any action of alcohol through the mother upon the development of the individual (*after* conception) has been carefully observed. In his work, which was done upon the dog, the father alone was treated with alcohol, both father and mother being healthy in the first place. The pups showed definite proof of blastophthoria.

The Parallel between Alcohol and Lead.—As I pointed out some years ago, and showed in a paper, “*Racial Hygiene or Negative Hygiene,*” read before the Congress of the Royal Institute of Public Health in 1908, there is a detailed parallelism

¹ *The Sexual Question*, pp. 36, 37, French edition p. 35.

between the action of lead and the action of alcohol upon parenthood. In the case of both poisons we have definite evidence of blastophthoria, though in both cases the effects of maternal poisoning are much more serious since, in the case of the mother, we have to reckon with the effects of ante-natal nutrition—though whether these have been reckoned as “nature” or “nurture,” or indeed have been distinguished at all by some enquirers, is a point which may be left to a more convenient season. Here, however, without any intention to anticipate what may be said in a forthcoming article upon the racial influence of lead, reference may be made to the evidence cited and discussed by the present writer in his paper, “Alcoholism and Eugenics” (*British Journal of Inebriety*, July, 1909), to which may be added the following quotation from the new edition of Horsley and Sturge’s *Alcohol and the Human Body*, p. 294 :

“ Prof. Adami describes a series of thirty-two cases in which the fathers suffered from lead-poisoning, whilst the mothers were free from such condition. The offspring were affected adversely as to mortality, and showed signs of mental and other disturbances in a way that was very striking. Again, a case which is typical of hundreds of others is reported by Dr. Norman Kerr, in which first was born a son and then a daughter, who both mentally and physically were excellent specimens of vigorous humanity. After the birth of the daughter the father fell into habits of dissipation and rapidly became an habitual drunkard. He had four more children, of whom one was defective in mind, while the remainder were complete idiots.”

Reference may also be made to the well-known work of Bezzola, which may be most conveniently quoted from Forel as follows :—

“ The recent researches of Bezzola seem to prove that the old belief in the bad quality of children conceived during drunkenness is not without foundation. Relying on the Swiss census of 1900, in which there figure nine thousand idiots, and after careful examination of the bulletins concerning them, this author has proved that there are two acute annual maximum periods for the conception of idiots (calculated from nine months before birth). In the wine-growing districts the maximum conception of idiots at the time of vintage is enormous, while it is almost *nil* at other periods. Moreover, these two maximum periods come at the time of year when conception is at a minimum among the rest of the population ; the maximum of normal conceptions occurring at the beginning of summer.

“ If these facts are confirmed by further research, we may conclude

that even acute alcoholism¹ has a blastophthoric action. We may, therefore, assume that when a germinal cell leaves its gland at the moment when it is impregnated with alcohol, and achieves conjugation, it is unable to return to its normal condition, for want of opportunity to be completely and promptly cleansed by nutrition and the circulation. This explains how it may transmit to the individual which develops from it all kinds of taints and defects."

It is quite impossible here to describe in detail the more recent evidence regarding alcoholic blastophthoria. There are appended in a foot-note a few typical references.²

Blastophthoria and Gametogenesis.—A theoretical point is in my judgment of no small interest. Our modern ideas of the "continuity of the germ-plasm" have inclined many students of heredity, unacquainted with the actual physiology of the metazoan body, towards the belief that the germ-plasm and the germ-cells are things fixed and unchangeable in the course of the individual life. There could be no greater error. On the contrary, in both sexes during the whole of the reproductive period, the germ-cells are continuously being made, in consequence of continuous vital processes involving the growth and division of pre-existing cells. The proper name for a germ-cell is a gamete, and the process of formation of germ-cells, equally continuous and equally necessary in both sexes, is known as gametogenesis. Directly we realise that every germ-cell is a product of a complicated process of cell-growth and cell division, which involves nutrition, respiration, excretion, and, above all, karyokinesis, on the part of living protoplasm, we shall see how incomprehensible it would be if the composition of the blood of the individual had no influence upon gametogenesis, and through it upon the natural quality of future individuals.

¹ On this point see also the remarks of Weismann, which are in entire agreement with the above; *The Germ Plasm*, English translation, p. 387.

² Causation of mental defect in children, W. A. Potts, *British Medical Journal*, October 14th, 1905.

Inter-Departmental Committee on Physical Deterioration, evidence of Dr. Claye Shaw, Vol. III., Appendix 16, 1904.

A morphological continuity of germ-cells as the basis of heredity and variation. John Beard, *Review of Neurology and Psychiatry*, Vol. II., 1904.

The problem of heredity with special reference to the pre-embryonic life, W. L. Andriezen, *Journal of Mental Science*, January, 1905. See also Dr. Wigglesworth in the same journal, October, 1902.

Heredity and Disease, by F. W. Mott, *British Medical Journal*, October 28th, 1905.

The reader may also be referred to Chapter 15, "The Influence of Parental Alcoholism upon the Race," in Horsley and Sturge's *Alcohol and the Human Body*, Macmillan.

There is a general impression, however, not only amongst the lay public, that on modern theories the germ-cells are simply something packed away for their future destiny as coins are packed away in a sovereign purse. How absurd this is one can only realise when one recalls the remarkable phenomena, affecting every tissue of the body, which are associated with the menstrual process of ovulation or gametogenesis in the case of one sex. It may be noted as a clinical fact that these phenomena are markedly affected by alcohol.

Blastophthoria and Mendelism.—The reader must permit me to note yet one other point of theory, as this question has never yet been dealt with in the light of the new knowledge of gametogenesis which Mendelian experiment, coupled with microscopic cytology, has revealed during the last few years. We must realise that, as has been shown above, blastophthoria is not a case of heredity in the proper sense of the word. We must not, therefore, expect it to obey the Mendelian laws, and in point of fact it does not, whether the poison in question be alcohol or lead, morphine or the toxin of syphilis. Similarly in the experiments of MacDougal, the American botanist, upon plants, the production of variations, transmissible in successive generations, by the injection of chemical solutions into the ovaries, showed no Mendelian ratio. This is, of course, exactly what we should expect. No doubt it will be proved in due course that the individual is made up of definite factors, to use the Mendelian term, and that in gametogenesis these behave according to the law of segregation. We are to expect the influence of a protoplasmic poison, such as alcohol or lead, to act upon the vital processes of gametogenesis as upon any vital processes anywhere. The resulting germ-cells will not be altered in the main lines of their constitution, they will simply be damaged—*avariées*, as Brieux would put it. Protoplasmic poisons will damage a nerve cell or a liver-cell, but they remain a nerve cell or a liver cell. In the same way we may imagine that the gametes resulting from gametogenesis that has been vitiated by the influence of a racial poison are what they would in any case have been, except that they are damaged. The motor-car, so to say, is still a Napier and not a Daimler, but owing to bad conditions in the

course of manufacture, it is rusty, "ill-assembled," cannot be "tuned up," and is, in short, damaged or defective. What we readily understand of the dead machine may help us to understand the case of the living one.

Blastophthoria, by whatever agent, is equally possible in both sexes, and in this respect there is strict parity between fatherhood and motherhood, as there is in the case of alcoholism symptomatic of anterior degeneracy, which was briefly recognised in an early part of this paper. In dealing with blastophthoria, emphasis has of course been laid, both in the case of human beings and in the experimental work done with the lower animals, upon the case of *paternal* blastophthoria, for the excellent reason that, in the case of the mother, so many other modes of action are possible that blastophthoria—as distinguished, for instance, from simple ante-natal poisoning of the embryo or foetus,—cannot be demonstrated. The crucial observations must be made upon the male sex, whose organic relation to the child wholly consists in the germ-cell alone.

In leaving this subject and passing to a further question of no less importance, it may be noted that much experimental and observational work remains to be done. The modern chemical tests for lead, to take a single instance, are so delicate that it would be desirable to see whether, in cases of lead-poisoning, contamination of the paternal germ cells by lead—no doubt in the form of a soluble salt—cannot be chemically demonstrated. Possibly this has been done, but if so, the record has escaped my search. Similar inquiries should be undertaken in the case of paternal alcoholism. In neither case are there insuperable practical difficulties, nor is there any lack of clinical material, and the matter may be commended to the study of young house-physicians and surgeons. We have definite chemical evidence that alcohol reaches the reproductive glands, but it should be looked for in their secretions.

E. Alcohol during primary Nurture

What follows has regard only to one sex, and does not depend upon blastophthoria at all, though it must be clearly understood that poisoning of the germ cells themselves is as

possible and disastrous in the female sex as in the male sex. In practical eugenics—though, sooth to say, when eugenics begins to become practical some of us seem to think that it is wandering from the point—we have to reckon with the fact of expectant motherhood. To decline to do so is, in effect, to declare that eugenics is concerned with bringing the right gametes together, but does not trouble itself about what may or may not happen to the product of their conjugation. We desire, however, not fertilised ova merely, but worthy men and women, and expectant motherhood is therefore part of our province. If we do not so recognise it at present, the next generation of eugenists certainly will.

We here have left the department of nature and have concerned ourselves with the primary stage of nurture. The secondary stage of nurture—the first post-natal stage—is, normally, that of lactation. Those who, like primitive man and contemporary jurisprudence, attach overwhelming importance to that particular change of environment which we call birth, may protest that, if the care of expectant motherhood is eugenics, at any rate the question of lactation is not. We need not argue about names, but it is necessary for any useful presentation of the relations between alcohol and parenthood that we should consider the stages of development here defined—necessary because their study lends additional weight to the principle, *protect parenthood from alcohol*, which is or should be the guiding idea of all sane and well-directed temperance reform.

The distinction between (1) the case of alcoholism as a mere symptom of preceding defect ; (2) the case of blastophthoria,—each of these applying equally to both sexes of parents ; (3) the case of ante-natal alcoholic poisoning, acute and chronic, by means of maternal drinking ; (4) the case of post-natal alcoholic poisoning through the mother's milk ; (5) the influence of the alcoholic home upon children, and (6) the influence of the direct ingestion of alcohol by children—will form the obvious basis for the very careful analysis of data which will be required of any workers who, as I hope, may care to undertake the difficult question of determining the comparative influence of nature and of the *various kinds of nurture*, ante-natal and post-natal, not for-

getting blastophthoria, in regard to the relations between alcohol and parenthood. They will have to decide, also, where to put blastophthoria in this too-simple category. But our modern Pythagoreans, in their assiduous worship of Number, must not be led by the immutable fourness of twice two, to suppose that, if the units on which they demonstrate it be (1) a nebula, (2) a memory, (3) a budget, (4) Pantheism, either the astronomer, the lover, the financier, or the philosopher will cease to distinguish between these several objects of their attention.

E.—Ante-Natal Alcoholism

On the subject of ante-natal alcoholism, the greatest living authority is my friend and teacher, Dr. J. W. Ballantyne of Edinburgh. It is fortunately not necessary for us to consult his large work on "Ante-natal Pathology," as he contributed an important paper on this subject to our first National Conference on Infantile Mortality held in 1906. We decided to reprint the Report of that Conference and I believe that a few copies of the reprint are still obtainable from Messrs. P. S. King & Son. Dr. Ballantyne's paper on the "Ante-natal Causes of Infantile Mortality, including Parental Alcoholism," cannot be reproduced in full here, running as it does to more than thirty pages of the Report. That, it may be noted, is my difficulty throughout this article. An adequate discussion of the subject would involve the writing of a large volume, so great is the mass of modern knowledge regarding it, and wherever one passes the facts over, one feels one is failing to do justice to the case. If we were to go into this subject as it really requires, we should of course have to distinguish those various stages in ante-natal nurture which are distinguished by embryologists. For the very rough and ready analysis of this subject which is all that is possible here, it may suffice to regard the whole of the ante-natal period as one stage of nurture; and here a paragraph must be quoted from Dr. Ballantyne :

"It is only of recent years that experimental methods have supplied us with the chemical proof that alcohol given to a pregnant animal finds its way to the fetal tissues, while the demonstration that alcohol given to a woman in labour can be found in her infant at birth was also long in coming.

The delay, however, in the establishment of proof of the transmission of alcohol from the maternal to the foetal organism, appears to have been due not to any difficulty in transmission, but to the extraordinary rapidity of it. This fact, taken in conjunction with that other fact, the great diffusibility of alcohol, explains the failure of previous experimenters to find the drug in the foetus, the *liquor amnii*, and the placenta; they were too late in looking for it; it had already been and had gone before tests were carried out to detect its presence."

After dealing with some of the recent work, such as that of Matthews Duncan, Kirk, Lancereaux, Sullivan, etc., Dr. Ballantyne summarises as follows:

"It must then be concluded that parental and especially maternal alcoholism of the kind to which the name of chronic drunkenness or persistent soaking is applied, is the source of both ante-natal and post-natal mortality. It acts in all the three ways in which I indicated that ante-natal causes can be shown to act in relation to the increase of infantile mortality, *viz.*, by causing abortions, by predisposing to premature labours, and by weakening the infant by disease or deformity so that it more readily succumbs to ordinary morbid influences at and after birth. By causing diseases of the kidneys and of the placenta it also leads to that failure of the filter to which I have already referred; the placenta being damaged, not only does the alcohol more readily pass through it itself, but it is also possible for other poisons, germs, and toxins, to cross over into the foetal economy. So it comes about that the most disastrous consequences are entailed upon the unborn infant in connection with syphilis, lead-poisoning, fevers, and the like in the intemperate mother."

It must be remembered that this was written as long ago as 1906, since when much further work has been done by Hodge, Laitinen, and others. A good deal of this work will be found summarised in the forthcoming Report of the International Congress on Alcoholism held in London in 1909.

The particular case we are now discussing is of special interest because of the analysis which it requires, and a paragraph may here be quoted from my own study of the parallel between alcohol and lead which is disclosed by the most recent observations:

"We see here [in the case of lead poisoning] that, as is also true in the case of alcoholism, the germinal tissue itself may escape, or, at any rate, may recover from, the effects of chronic poisoning of the individual who is its host. The race is more resistant than the individual. If, however, the poisoning continues whilst a new individual is being formed—that is to say,

during pregnancy—that new individual succumbs, and, indeed, is far more gravely affected than its mother. Such a pregnant woman presents three distinct living objects for our study. Her own body is one, and this is already developed. It has some measure of resistance to the poison, but is gravely affected. The embryo is the second; it is developing, and because developing is highly susceptible. It is usually killed before birth. The third is the germ-plasm or the race, and this, as we have seen, may withstand the poison so well that when the poisoning is discontinued healthy children may be produced from it. Undoubtedly the case is the same as regards alcohol. The race or germ-plasm is most resistant, the developing individual is least resistant, and the adult individual—that is to say, the mother—occupies an intermediate position in this respect.”¹

F. Alcohol and Secondary Nurture

The influence of maternal alcoholism has an organic relation to the child after birth if it is nursed by its mother. In the case of the nursing mother there is one fresh avenue of excretion which the organism can employ for ridding itself of the poison, and to the efforts of the lungs and the kidneys are added those of the mammae. “Alcohol can be readily traced in the mother’s milk within twenty minutes of its ingestion into her stomach, and it may be detected in it for as long as eight hours after a large dose. . . . Numerous cases have been reported in which infants at the breast have been the subjects of both acute and chronic alcoholic poisoning, the results of which have remained as permanent defects in the individual.”²

The reader should also consult the chapter “Alcoholism in relation to women and children,” contributed by Mrs. Scharlieb to the volume, *The Drink Problem*, in the present writer’s New Library of Medicine. One sentence may be quoted: “The milk of the alcoholic mother not only contains alcohol but it is otherwise unsuitable for the infant’s nourishment; it does not contain the proper proportions of proteid, sugar, fat, etc., and it is therefore not suited for the building up of a healthy body.”

At this stage of nurture, I must leave the question for the present. Enough will have been said to show how many distinctions require to be made in any analysis of scientific value.

¹ *Parenthood and Race-culture, An Outline of Eugenics*, p. 249.

² Lees and Raper Memorial Lecture, 1908, delivered at Oxford, under the Presidency of Prof. William Osler, by W. McAdam Eccles, M.S., F.R.C.S.

It has to be added that large numbers of children take alcohol not merely before birth nor through the mother after birth but by their own mouths. In any analysis of nature and nurture the consequences of these various kinds of youthful drinking will of course require to be distinguished, each of them in its turn, from blastophthoria, whether paternal, maternal, or both; and all of these from the inheritance of nervous defect exhibiting the symptom of alcoholism in one or both parents. The problem is really much more complicated than this, involving as it does all the complexities of nutrition during gameto-genesis, and in the various distinct stages of ante-natal and post-natal life: not to mention questions of dosage, dilution, chronicity, idiosyncrasy, etc. But the outlines of it, at any rate, have been indicated.

This part of the subject may be concluded with the brief verdict of Drs. A. and F. Leppmann of Berlin, who contribute the chapter on "Alcoholism and Morphinism" to Senator and Kaminer's recent comprehensive treatise on *Marriage and Disease*:

"The four special forms of degeneration, epilepsy, idiocy, drunkenness, and an early tendency to crime, appear in the children of drunkards undoubtedly far more frequently than in the offspring of other degenerates, say of lunatics, neurasthenics or hysterical persons."

Finally, it falls to be recorded that in a lecture on "The Relative Strength of Nurture and Nature," a recent statistical enquirer, working upon the data of defective children in the special schools in Manchester—working, be it most notably observed, upon this admittedly degenerate material—has come to the following conclusion:

"The little influence it [drink] has is in favour of the children of drinking parents; they are healthier and more intelligent. These results are certainly startling and rather upset one's preconceived ideas, but it is perhaps a consolation that to the obvious and visible miseries of the children, arising from drink, lowered intelligence and physique are not added."

G. The Society's Recommendations

The Eugenics Education Society has from the first paid attention to the question of inebriate parenthood, and it is worth while, I think, to quote here the memorandum which we presented to the Departmental Committee on inebriates, and which

is to be found in its report. The reader will notice that blastophthoria has been omitted from this memorandum. It could not have been discussed intelligibly without making the memorandum unduly long. The memorandum runs as follows :

" It may be pointed out that the children of the drunkard are on the average less capable of citizenship on account of

" (a) The inheritance of nervous defect inherent in the parent.

" (b) Intra-uterine alcoholic poisoning in cases where the mother is an inebriate.

" (c) Neglect, ill-feeding, accidents, blows, etc., which are responsible on the one hand for much infant mortality, and combined with the possible causes before mentioned, for the ultimate production of adults defective both in body and mind.

" It would appear, then, that the drunkard, if not effectively restrained, conduces to the production of a defective race, involving a grave financial burden upon the sober portion of the community, to say nothing of higher considerations. It therefore seems to the Eugenics Education Society of extreme importance that some substantial effort should be made for the reform of existing drunkards, or the permanent control of the irreformable.

" Scientific warrant for the foregoing propositions is now to be found in no small abundance. Reference may be made, for instance, to the chapter on ' Alcoholism and Human Degeneration ' in Dr. W. C. Sullivan's recent work, *Alcoholism* (Nisbet, 1906). Dr. Sullivan quotes the results of more than a dozen observers in this and other countries, and special attention may be drawn to his own well-known study of the history of 600 children born of 120 drunken mothers. The works of Professor Forel, of Zurich, are widely known in this connection, notably *Die Sexual Frage* and *The Hygiene of Nerves and Mind* (translation, Murray, 1907). Parental alcoholism as a true cause of epilepsy in the offspring is now generally recognised. For numerous and detailed proofs from many sources reference may be made to p. 210 of the last work named.

" It is not necessary, however, to go over the ground which has doubtless been covered by the Royal Commission on the Care and Control of the Feeble-minded.

" The existing laws comply to only a very small and almost negligible extent with the eugenic requirement. They only deal with (a) the very minute proportion of inebriates who can be induced to voluntarily sign away their liberty, and (b) those who are also criminal or all but hopeless, and who have done harm already, either as individuals or in becoming parents. The third group of inebriates (c) not included in (a) or (b) constitute the overwhelming majority of the whole. They are absolutely untouched by the present law, and further powers are urgently required to deal with them.

" Such legislation would be by no means without precedent, and may avail itself of the experience of several of our own colonies and various

foreign countries. Such methods as compulsory control on petition, guardianship, and so forth are in employment, for instance, in the Australian Commonwealth and New Zealand, California, Connecticut, Massachusetts, various cantons in Switzerland, Nova Scotia, etc.

"To sum up, the Society advocates the retention of the present law so far as classes (a) and (b) are concerned, but would most strongly urge the addition of powers to deal with that great majority of inebriates whom the present law does not touch."

If any part of our knowledge on this subject is more extensive and decisive than another, it is that which demonstrates to us the native and transmissible defects of many chronic inebriates. It will be remembered that Dr. Branthwaite found that approximately two-thirds of all the certified inebriates in England and Wales suffered from native and transmissible defect of which, of course, their alcoholism was only a symptom—though, as has been shown above, an aggravating symptom. I have dealt with this aspect of the subject at great length in my book, to which the reader must be referred. The quality and fate of the children of these women, as officially recorded, is almost too horrible for description in these pages. On the other hand, of course, there is the recent assurance that the children of parents who drink are favoured in the matter of physique and intelligence. Eugenists must decide as to their duty. I fancy that the dictum, *Protect parenthood from alcohol*, with all its variety of possible application to negative eugenics and to what one may conveniently advocate and define as preventive eugenics, will be found worth following. But if, on the strength of a comparison between defective children whose parents were reported to "drink," and other defective children whose parents were reported not to "drink"—whatever the word may mean—we agree that the little influence drink has favours the health and intelligence of children, we are bound by our principles as eugenists to do everything that lies in our power, to have as much alcohol as possible drunk by parents and potential parents, and to encourage parenthood on the part of drunkards. This may involve sacrificing the individual to the race, but that cannot be helped, Nature being so singularly constructed—and in any case there would soon be no individuals at all.

H. Conclusion

I am aware, that, notwithstanding that I have deliberately omitted much, this article is far too long for convenience, but I hope the reader will think that the importance of alcohol in relation to the duration of races and states fully justifies its length. I have elsewhere adduced arguments in favour of the view that the practically complete immunity of their parenthood from alcohol is one of the great factors that explain the all but unexampled persistence of the Jews, and their present status in the van of the world's thought and work. It may be added that the emergence of sober nations, such as Japan and Turkey, into contemporary history, and the possibilities latent in China—to mention none other of the “dying nations” of glass-eyed statesmen—incline me to believe that in the Armageddon of the future, those ancient races and civilisations, hitherto so much despised, which do not drink alcohol, will be in a position of immense advantage as compared with the relatively transient western civilisations which continue to countenance the use of this most potent of all agents of racial degeneration.